Project Spotlight: S-46 Tailwater Weir and Gate Replacement

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Operations, Engineering and Construction
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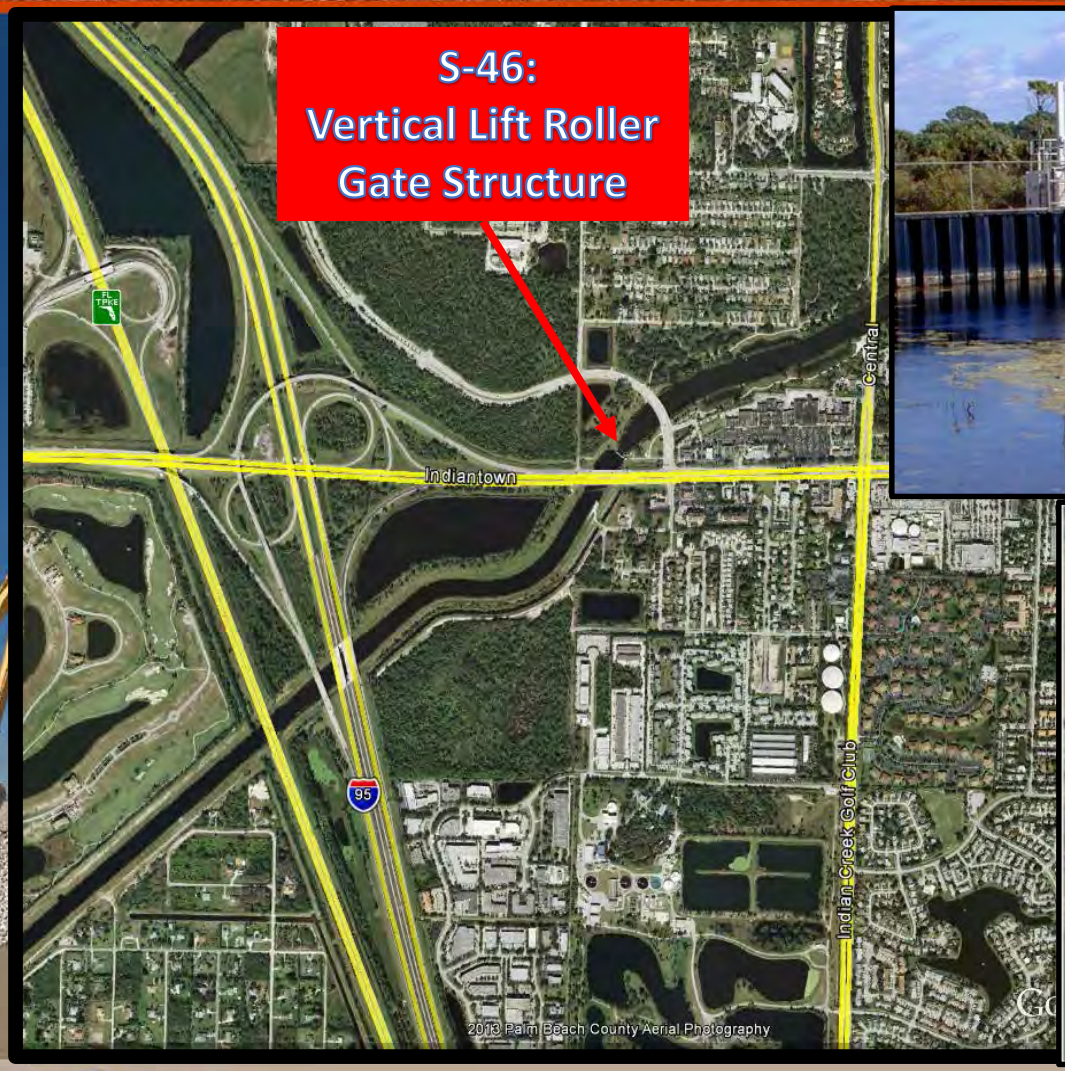
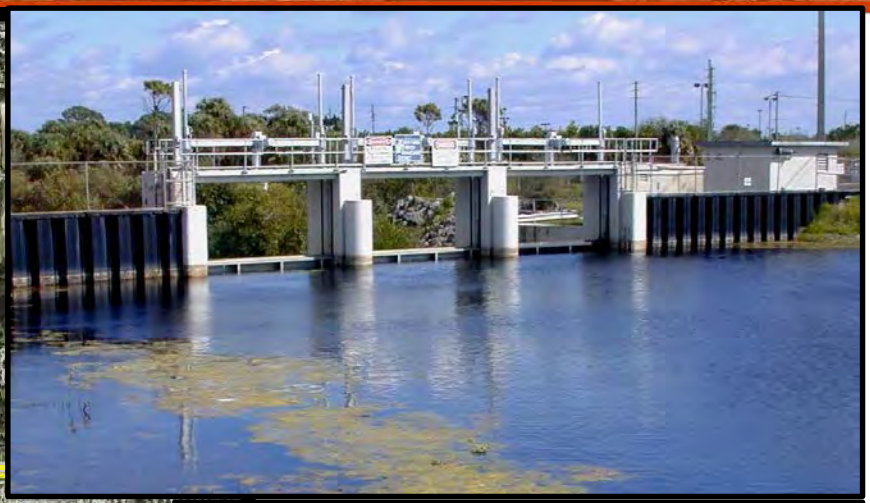
Structure S-46 Location
Palm Beach County, FL





S-46 Tailwater Weir Project Team

District Project Manager:	*Martha Fox*
District Design Team:	*Shawn Gao, P.E.* *Mike Millares, P.E.* *John Alban, P.E.*
District Engineering Support:	*Infrastructure Management Bureau*
District Field Support:	*West Palm Beach Field Station*
Operations Support:	*Water Management Operations*
Consulting Inspection Support:	*TY Lin International*
Construction Contractor:	*Murray Logan Construction*

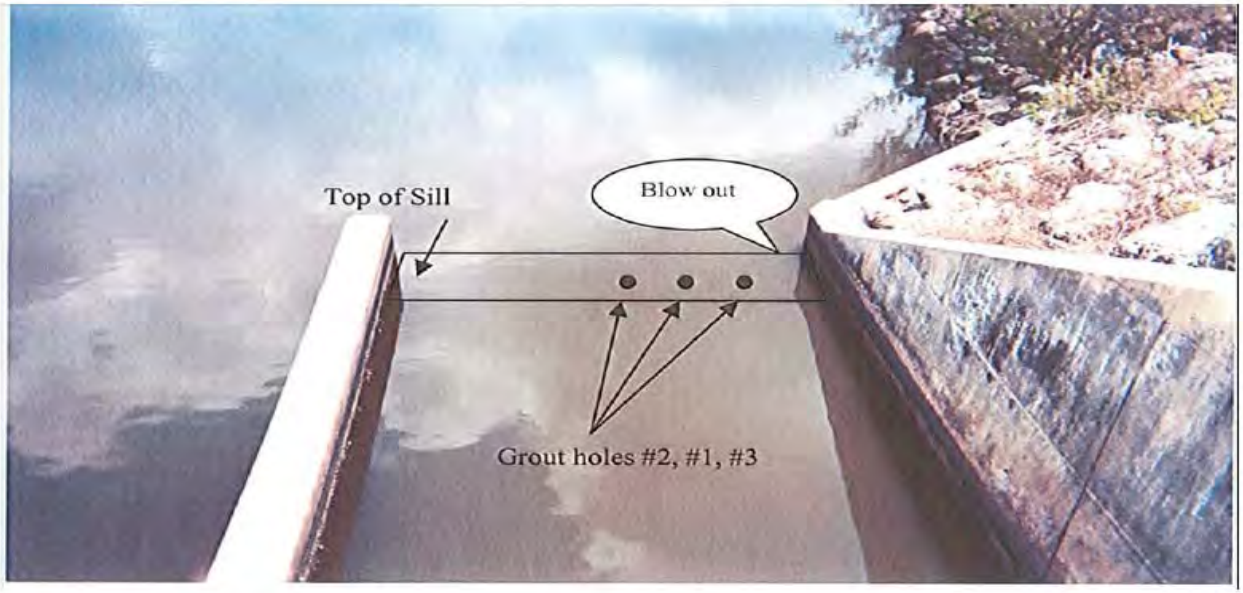
Project Background

- Constructed in 1958 by the United States Army Corps of Engineers to control upstream stages in the C-18 Canal
- 3-Bay reinforced concrete gated coastal spillway structure
- Design discharge rate of 3420 cubic feet per second
- Steel sheetpile cutoff walls and wing walls
- Rubble riprap serves as downstream scour protection

Project Issue: Seepage

First documented in 1996, upwelling on the downstream side of the structure identified the potential for sediment transport beneath the base slab and eventual concerns for stability of the overall structure.

Since that time, various field investigations, grout repairs, monitoring and studies have demonstrated the need to reduce the hydraulic gradient across the structure in the form of a tailwater weir.



Overall Project Scope

- Construct new steel sheetpile tailwater weir structure
- Replace existing carbon steel vertical lift roller gates with new stainless steel gates
- Rehabilitate corroded gate hoist platform assemblies
- Armor canal bottom with rip-rap and marine mattress
- Construct walkway stilling wells
- Stabilize embankment by re-grading
- Install passive cathodic protection

Tailwater Weir Structure

The upstream sheetpile section of the tailwater weir creates a stilling basin for direct discharge from Structure S-46. The basin overflows at Elevation 3.0', onto the scour protection within the weir structure, ultimately discharging to the downstream tidal areas within the C-18 Canal.

Project Issue: Downstream Scour

- **For the area downstream of S-46 and upstream of the new weir, existing riprap will be removed. An 8" layer of bedding stone-filled marine mattress will be installed, with additional scour protection provided by a 30" layer of Type C riprap.**
- **The area within the tailwater weir will receive a layered configuration of marine mattress, hardened with a 7' thick section of granite riprap.**
- **For areas downstream of the weir structure, the channel bottom and embankments will be armored against high velocity flow, as specified, through the use of marine mattress, existing riprap and new riprap.**

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Marine Mattress Fill & Placement Operation

Gate Hoist Platform Assemblies

Excessive surface corrosion throughout all three gate hoist platform assemblies

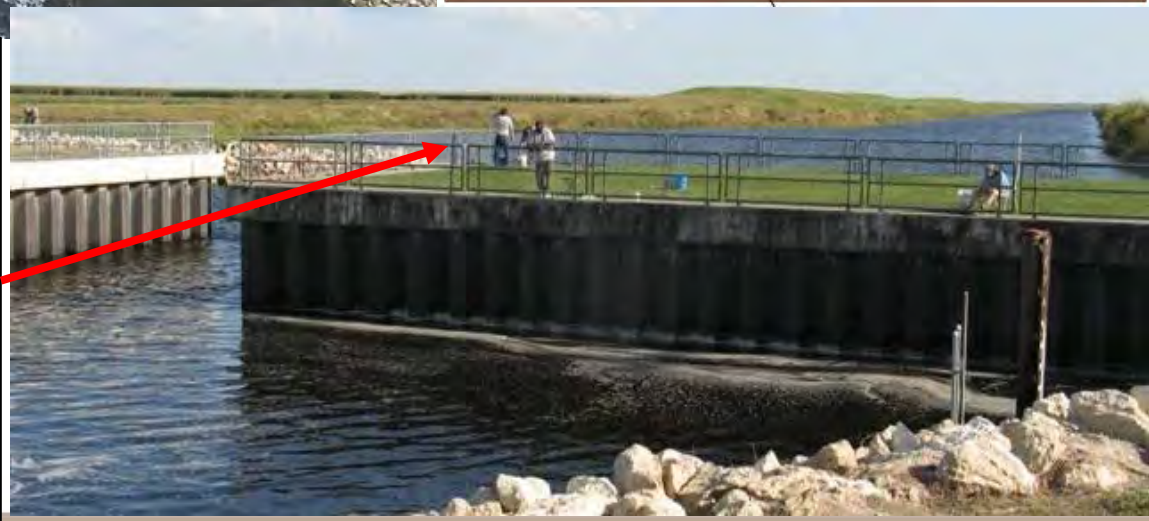
Two of the three platforms have been sandblasted, galvanized, epoxy painted, re-assembled and delivered to the S-46 site

Gate Replacement

Replacing all three existing carbon steel gates with new stainless steel gate assemblies

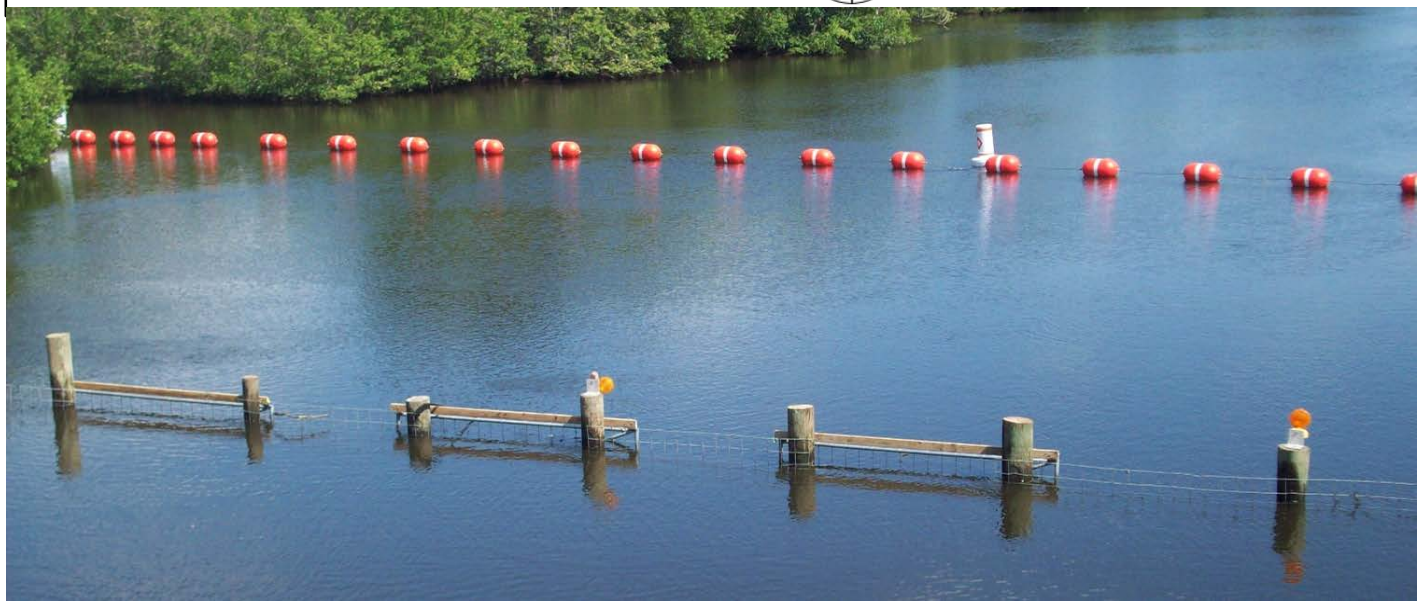
Recreational Considerations

Backfilled portions of the weir structure have been designed to accommodate limited fishing. The weir structure at S-68, shown here, was constructed in 1996, also to address seepage concerns.



Temporary Manatee Barrier

- Intended to protect foraging manatees from construction activities
- USFWS approved fencing measures as a prototype
- Woven galvanized steel mesh fencing with submerged gates
- Spans complete canal cross section, from mean high water to existing canal bottom
- Dedicated manatee observer required when working



S-46 Construction Status

- Approach piers completed, with both upstream and downstream weirs driven to elevation
- Fabrication of the replacement gates underway, with an expected delivery date of March 2016
- Marine mattress assembly is 50% complete with 20% installed, to date
- Two of three gate hoist platform assemblies completed; sand blasted, galvanized and returned to the site.

Construction Cost / Schedule:

S46 Tailwater Weir and Gate Replacement		Itemized Costs
General Site Work	$	650,000.00
Replacement Gates	$	624,000.00
Weir Construction	$	1,319,650.00
Scour Protection	$	1,600,000.00
Total	$	4,193,650.00

S46 Construction Schedule Dates	
Milestone #1 - Completion of Gates	April 30, 2016
Substantial Completion	July 13, 2016
Final Acceptance	September 11, 2016

Questions?